

REMARKS:

The claims in the application are now 23-39.

Favorable reconsideration of the application as amended is respectfully requested.

Claims 1-22 have been replaced by Claims 23-39 which find clear support throughout the present application and drawings. The Abstract has been inserted on a separate sheet as requested on page 2 of the Office Action. It is respectfully pointed out WO 97/00751 is not being incorporated by reference into the present application but was just cited as an example of the prior art over which the present invention is an explicit improvement. This reference has already been made of record (and applied) in the prosecution of the present application, and additionally corresponds to U.S. Pat. No. 6,202,757 which can be incorporated by reference, should the Examiner so request.

The present set of claims also eliminates the formal rejections set forth on pages 2 and 3 of the Office Action. Concerning the enablement rejection under 35 U.S.C. 112, first paragraph, raised at the bottom of page 2 of the Office Action, it is respectfully pointed out the testing shown in the graphs of Figs. 3-7 in the present application clearly document how a second impact is generated one millisecond after the first impact (please see, in particular, Fig. 3 and page 11, lines 18-31). One skilled in the art, would clearly understand how to control the stamping member 2 and counteracting means 3 to cause a second impact of stamping member 2 against material body 1 within a short period of time, e.g., one millisecond (reference is being made to preferred embodiments of the present invention illustrated in the drawings of the present application).

Accordingly, the only outstanding issue is the art rejection of the claims. More particularly, Claims 1-22 have been rejected under 35 U.S.C. §102 as being anticipated by either U.S. Pat. No. 4,131,164 to Hague et al or U.S. Pat. No. 4,226,111 to Wahli, and under 35 U.S.C. §103 as obvious over either of these two references and additionally in view of WO 97/00751 to Dahlberg. However, it is respectfully submitted all claims pending herein recite patentable subject matter over any possible combination of this art, for the following reasons.

As described in the present application, the present invention explicitly eliminates unwanted temperature generation during stamping or compacting of a material body 1. The claimed invention is based upon the discovery of controlling a stamping member 2 impacting the material body 1 to supply energy thereto to such an extent to contribute to the reciprocating wave generated in the material body 1 the moment the stamping member 2 bounces back from the material body 1. Substantially smaller impacting impulse is required to achieve desired deformation of the material body 1 with very low temperature generation.

These and other advantages are attained by the inventive method herein which relates to deformation under adiabatic coalescence. One or several powerful impacts against the material body 1 are required for adiabatic coalescence to occur. The invention is based on the understanding that a considerably less powerful impact is required for a given deformation when an additional impact is generated by a stamping member 2 against a material body 1 within a period during which kinetic energy of a reciprocating wave, generated within the material body 1 when the stamping member 2 rebounds therefrom

after previous impact, generates additional deformation in the material body 1, as opposed to the situation where additional impact is applied only after the reciprocating wave has subsided.

Thus, desired adiabatic deformation of the material body 1 is achieved with a lower total supply of energy to the material body, and thereby comparatively low temperature increase as compared with the prior art. With the claimed invention, the impact energy F of the stamping member 2 is efficiently used in the best possible manner to generate as large a deformation as possible in the material body 1.

The features of the presently claimed invention together with the accompanying advantages attained thereby are neither taught nor suggested by the applied art for the following reasons.

Both Hague et al and Wahli relate to reworking or reshaping of a workpiece by forging, in which a series of relatively small impacts are generated against the workpiece to be forged. Neither of these references contains any suggestion of providing adiabatic deformation by generating one or several very powerful impacts against a material body 1 to be deformed in the fashion of the claimed invention, i.e., utilizing the deformation wave generated in the material body 1 as claimed herein. Accordingly, both these documents fail to anticipate the invention recited in the claims herein.

Furthermore, Dahlberg fails to indicate that the stamping member of his impact machine should be adapted to generate an additional impact against a material body within a period during which kinetic energy of a reciprocating wave in the material body, generated in connection with a previous rebound motion of the stamping member,

generates additional deformation in the material body by gradual activation of sliding planes or a mutual displacement of powder grains in the material body. Such a reciprocating wave in not even mentioned in Dahlberg. As pointed out above, Dahlberg is described in the present application as forming part of the prior art over which the claimed invention is an explicit improvement. For example, the method taught in Dahlberg and described at page 2, lines 1-12 of the present application is directly contrary to the invention recited in certain of the pending claims (please see, e.g., Claims 29 and 38).

Therefore, if anything, the combination of Dahlberg with Hague et al and Wahli teaches away from the invention being claimed herein. In this regard, it is respectfully pointed out the inventive device recited in Claims 36-39 is not suggested by any of these applied references. The remaining art of record has not been applied against the claims and will not be commented upon further at this time.

Accordingly, in view of the forgoing amendment and accompanying remarks, it is respectfully submitted all claims pending herein are in condition for allowance. Should the Examiner have any questions, then it is respectfully requested the undersigned attorney be contacted at the earliest convenience to discuss the present application.

Early favorable action is earnestly solicited.

Respectfully submitted,  
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